

ABSTRACT

Evaluation of surface roughness and push out bond strength of glass fiber post with and without surface pretreatments – a scanning electron microscopic study.

Aim:

The aim of this in vitro study is to evaluate and compare surface roughness and push out bond strength of glass fiber post with and without surface pretreatments using scanning electron microscopy.

Methodology:

40 extracted human maxillary central incisors were selected. The teeth were decoronated at 15 mm coronally from the root apex. The teeth samples were mounted in the tooth coloured acrylic block embedding the root inside the resin. The teeth were subjected to root canal treatment in which biomechanical preparation was done by step back technique, irrigation protocol with 3 % NaOCL and 17% EDTA, and obturation done by cold lateral condensation technique using 2% gutta percha and AH plus root canal sealer. The post space preparation was done with peaso reamers size1, 2 and 3, leaving a minimum 4mm apical seal and created a standard post space of 10mm. 40 glass fibre post (Easy Post, Dentsply) were divided into 4 groups based on the surface treatment of the post with 10 in each. Group I: Without Pre-treatment (Control Group) (10 Nos), Group II : Pre-treatment with 9.6%

hydrofluoric acid (10 Nos), Group III : Sandblasting with 110 μ m aluminum oxide particles (10 Nos), Group IV : Pretreatment with Er:YAG Laser (10 Nos). The surface roughness analysis with and without pre-treatment was done under Scanning Electron Microscope and measured in Mountains map premium 7.4 software. The posts were luted with Self adhesive resin cement (RelyX U200) and light cured for 40 seconds. 40 samples luted with glass fibre posts were transversely sectioned perpendicular to the post starting at 6mm from the apex of the specimen using a hard tissue microtome under continuous irrigation. In this manner, 3 slices of 1.0 \pm 0.2mm were created pertaining to the cervical, middle and apical region of each root specimen resulting in 30 slices/ group. Push-out bond strength was evaluated using universal testing machine at a cross head speed of 0.5 mm/min. The values were recorded and tabulated.

Result:

One way ANOVA and Post hoc Tukey HSD tests were done and was found out that the surface roughness has been increased significantly in all surface pretreatments compared to control group. The push out bond strength of post is significantly increased when the post surface is treated with 9.6% hydrofluoric acid at all the three levels.

Conclusion:

It was concluded that acid etching the post surface with 9.6% hydrofluoric acid increased the push out bond strength significantly without changing structural integrity of the post. The surface roughness created by

sand blasting which was significantly higher resulted in more structural loss and did not aided in better push out bond strength. The results of Er:YAG laser is comparable with that of sand blasting, therefore it can be used as an alternative to sand blasting in clinical situations.

Key words:

Surface pretreatments, surface roughness, sand blasting, 9.6% hydrofluoric acid, Er:YAG laser, Push out bond strength.